

Applicant: JOHNSON *et al.*  
Serial No: 09/840,080  
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This listing of claims will replace all prior versions and listings of claims in the Application.

**LISTING OF CLAIMS:**

1. (Currently Amended) A gas analysis device for remotely determining concentrations of at least two exhaust gas constituents in ~~at least one characteristic of~~ a vehicle emission plume, comprising:

a radiation source which directs radiation through an emission plume of a moving vehicle;

~~a plurality of moveable~~ at least two filters, arranged on a rotatable filter wheel, that are sequentially positionable to receive the radiation from ~~said the~~ radiation source after the radiation has passed through ~~a the vehicle~~ emission plume of the vehicle, wherein each of ~~said the~~ at least two filters ~~being~~ is capable of filtering out radiation except for a predetermined wavelength band; and

a detector positioned such that radiation from ~~said the~~ radiation source may be sequentially directed onto ~~said the~~ detector via the at least two filters to thereby produce ~~a plurality of~~ at least two detector responses proportional to the intensity of radiation directed onto the detector via ~~said the~~ at least two filters.

2. (cancelled)

3. (Currently Amended) The device according to claim ~~2~~ 1, wherein the filter wheel and the detector are housed in a housing which is sealed to substantially prevent radiation from reaching the detector except via one of ~~said the~~ at least two filters.

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4. (Currently Amended) The device according to claim 1, further comprising a general filter ~~which that~~ removes substantially all visible light from a radiation beam passed ~~through~~ ~~said general filter there-through~~, ~~said wherein the~~ general filter ~~being is~~ positioned such that a beam from ~~said the~~ radiation source ~~must pass~~ passes through ~~said the~~ general filter after passing through ~~a vehicle the~~ the emission plume of the vehicle ~~and but~~ before reaching ~~said the~~ detector.

5. (Currently Amended) The device according to claim 1, wherein ~~said plurality one~~ of the at least two filters ~~comprise at least one~~ comprises a reflective filter.

6. (Currently Amended) The device according to claim 1, wherein ~~said plurality one~~ of the at least two filters ~~comprise at least one~~ comprises a pass through filter.

7. (Currently Amended) The device according to claim 1, wherein ~~said the~~ radiation source projects a beam of infrared radiation across the path of a the moving vehicle.

8. (Currently Amended) The device according to claim 1, further comprising a processor for processing the at least ~~one two~~ detector ~~response~~ responses to provide information about the composition of ~~an exhaust~~ the emission plume of a the moving vehicle.

9. (Currently Amended) The device according to claim 8, further comprising an indicator for informing the processor which ~~filter~~ of the at least two filters is optically aligned with the detector for a particular detector response.

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10. (Currently Amended) A method for remotely determining concentrations of at least two exhaust gas constituents in at least one characteristic of a vehicle emission plume, comprising ~~the steps of:~~

~~a) providing a source of radiation and a plurality of filters each of which is capable of filtering out radiation except for radiation in a predetermined wavelength band;~~

b) directing radiation from ~~the~~ a radiation source through an emission plume of a moving vehicle to a first filter and then to a detector, wherein the first filter is arranged on a rotatable filter wheel and is capable of filtering out radiation except for a first predetermined wavelength band;

e) generating a first detector response indicative of the intensity of radiation received by the detector via the first filter;

~~d) positioning a further filter rotating the filter wheel~~ such that the radiation from the radiation source is directed through the exhaust emission plume of the moving vehicle to ~~the further~~ a second filter arranged on the filter wheel and then to the detector, wherein the second filter is capable of filtering out radiation except for a second predetermined wavelength band;

e) generating a ~~further~~ second detector response indicative of the intensity of ~~light~~ radiation received by the detector via the second filter positioned in step d); and

processing the first and second detector responses to provide information about the composition of the emission plume of the vehicle

~~f) optionally repeating a sequence of steps d) e) to obtain an additional detector response for each repetition of the sequence; and~~

~~g) determining at least one characteristic of the vehicle emission plume from said detector responses.~~

11. (cancelled)

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12. (Currently Amended) The method according to claim 10, further comprising: ~~the step of~~ passing the radiation ~~from the emission plume~~ through a general filter, to remove substantially all light having a wavelength outside a predetermined broad detection band, after the radiation has passed through the emission plume of the vehicle, but before the radiation reaches the filter wheel ~~prior to directing said radiation to the plurality of filters.~~

13. (Currently Amended) The method according to claim 10, wherein the ~~plurality of filters~~ filter wheel and the detector are located within a housing which is sealed to substantially prevent radiation from reaching the detector except via one of ~~said~~ the at least two filters.

14. (cancelled)

15. (Currently Amended) The method according to claim 14, wherein the radiation source ~~of radiation directs~~ projects a beam of infrared radiation across the path of a the moving vehicle.

16. (Currently Amended) The method according to claim 10, wherein one of the at least two filters ~~comprise at least one~~ comprises a pass through filter.

17. (Currently Amended) The method according to claim 10, wherein one of the at least two filters ~~comprise at least one~~ comprises a reflective filter.

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18. (Currently Amended) A method for remotely determining concentrations of at least two exhaust gas constituents in least one characteristic of a vehicle emission plume, comprising the steps of:

a) ~~providing a source of radiation and a plurality of filters each of which is capable of filtering out radiation except for radiation in a predetermined wavelength band;~~

b) directing radiation from the a radiation source through an emission plume of a moving vehicle to a first filter and then to a detector, wherein the first filter is capable of filtering out radiation except for a first predetermined wavelength band;

e) generating a first ~~detector~~ response indicative of the intensity of radiation received by the detector;

d) altering the position of positioning the detector such that the radiation from the radiation source may be directed through the exhaust emission plume to a ~~further~~ second filter and then to the detector, wherein the second filter is capable of filtering out radiation except for a second predetermined wavelength band;

e) ~~directing the radiation from the source to the filter positioned in step d) and then to the detector;~~

f) generating a second ~~detector~~ response indicative of the intensity of light radiation received by the detector via the ~~further~~ second filter; and

processing the first and second responses to provide information about the composition of the emission plume of the vehicle

g) ~~optionally repeating a sequence of steps d) f) to obtain an additional detector response for each repetition of the sequence; and~~

h) ~~determining at least one characteristic of the vehicle emission plume from said detector responses.~~

19-20. (cancelled)